

REMARKS

This paper responds to the Office Action mailed on June 26, 2006.

Claims 7, 30, 31 are amended, claims 2-4, 8, 13, 16, 23-29 and 36-37 are canceled without prejudice or waiver of patentable content, and no claims are added; as a result, claims 1, 5-7, 9-12, 14-15, 17-22 and 30-35 are now pending in this application.

§103 Rejection of the Claims

Claims 1, 5, 6, 9, 10-12, 14, 15 and 17-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Weimer et al. (U.S. Publication 2001/0014522) and Pan (U.S. 6,198,144). Applicant respectfully traverses this rejection.

The cited reference of Pan discloses a method for forming protective sidewalls on a word stack line that does not cover the entire sidewall. The passivation has a silicon nitride sidewall layer 22 by CVD that is formed over oxide layer 20 (see col. 4, line 41 to col. 5, line 35), which prevents the spacer 22 from covering the lower corner of the sidewall. This increases the oxidation of the corner of the stack to substrate intersection (see Fig. 5 and col. 5, line 59), and also for “preventing or reducing the conversion of those layers to non-conductive compounds during the reoxidation process”, referring to the “metal layers of the word line stack”.

The cited reference of Weimer discloses a method of rapid thermal processing (RTP) a gate stack in a special ambient, such as hydrogen, ammonia or hydrazine, to ensure low oxidation of tungsten or metal nitride (see abstract, para 0028) in a gate electrode stack. The Examiner noted that the cited reference does not disclose providing nitrogen fluoride (NF₃), and Applicant additionally respectfully submits that there is no disclosure of any form of fluorine containing gas, ambient or layer in the Weimer reference. The cited reference of Weimer teaches that the use of tungsten silicide results in less oxidation than the use of tungsten or tungsten nitride (see figure 6 and associated text beginning in para. 0030). There is no description or suggestion of reducing redeposition onto the substrate of a volatilized portion of the metal film. The cited reference of Weimer discloses reducing the amount of tungsten that is oxidized, but does not address the issue of volatilized metal such as tungsten, which occurs in any high temperature operation, not only oxidations, and does not suggest that there may be an issue related to redeposition of volatilized metal.

Specifically, Applicant respectfully submits that the suggested combination of references does not describe or suggest at least the feature of fluorine to “...*reduce redeposition of the metal film on the substrate and on the gate stack of a volatilized portion of the metal film* ...”, as recited in claim 1. There is no recognition of volatilized metal or of redeposition in the cited reference of Weimer, and no motivation to add the nitride spacers of the cited Pan reference. Nor would the suggested combination of reference result in the claimed method, since neither reference is directed to the reduction in redeposition of volatilized metal, but are rather directed towards reducing oxidation.

Applicant respectfully submits that the suggested combination of references does not describe or suggest at least the feature of “...*thermally processing the structure in the presence of a first composition such that the metal is more likely to combine with at least a portion of the first composition than with the structure* ...”, as recited in claims 9 and 18. The cited references may disclose how to reduce oxidation, and do not suggest reducing the redeposition of volatilized metal by providing a material having a higher reactivity to the volatilized metal than does the substrate.

The dependent claims are held to be in patentable condition at least as depending from base claims show to be patentable over the suggested combination of reference in the above discussion. In view of the above, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Allowable Subject Matter

Claims 7 and 30-35 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has rewritten claims 7 and 30 to be in independent form including the base claim and claim 31 now depends from claim 30. Applicant notes that claims 32 and 33 were rewritten in independent form in the prior response and are believed to be in proper form. Claims 34 and 35 depend upon allowable claim 31. Applicant submits that claims 7 and 30-35 are now in patentable condition, and thanks the Examiner for the indication of allowable subject matter.

CONCLUSION

Applicant respectfully submits that the remaining claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney David Suhl at (508) 865-8211, or the undersigned attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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By their Representatives,

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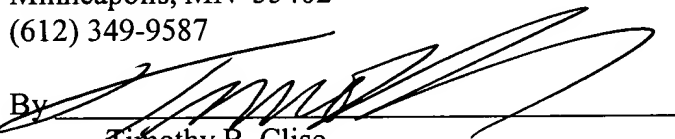
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Date

25 Sept '06

By



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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 25 day of September 2006.

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